DOCUMENT RESUME

ED 282 761 SE 048 187

AUTHOR Olstad, Roger G.; And Others
TITLE Predictive Validity of GPA, CAT and NTE Science Specialty Tests on Scores of a Performance Based Student Teaching Evaluation Instrument. Teacher Education Research Center Research Report No. 87-1.
INSTITUTION Washington Univ., Seattle. Teacher Education Research Center.
PUB DATE Apr 87
NOTE 11p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Predictor Variables; *Preservice Teacher Education; Science Education; *Science Teachers; Secondary School Teachers; Teacher Certification; *Teacher Characteristics; Teacher Effectiveness; *Teacher Qualifications; *Teacher Selection
IDENTIFIERS *Science Education Research

ABSTRACT

The issues of teacher quality expressed by many of the recent national reports on excellence in education have led a number of universities and colleges to increase the admission requirements and/or the exit standards for teacher certification programs. Emphasis has been placed on higher grade point averages and demonstrated academic ability on national standardized tests, among which are the Professional Knowledge, General Knowledge, and discipline specific Specialty Tests of the National Teachers Examination. The purpose of this study was to examine some of the criteria currently used for admission or exit standards and to seek effective predictors for student teaching success. Specifically, this study attempts to determine whether grade point average (GPA), the California Achievement Test of Basic Skills--Total score (CAT-T), and the National Teachers Exams Specialty Tests for Chemistry, Physics and General Science and for Biology and General Science predict student teaching competence as measured by a performance-based assessment instrument. A number of studies have looked at GPA and standardized test scores, specifically those core exams of the National Teachers Examination, and have concluded standardized test scores and GPA are not effective predictors for teaching success. This study on NTE Science Specialty Exams confirms these findings, in that the NTE Science Specialty Exams showed little predictive capability of these measures of academic competence. It would seem that academic competence is just one of the important criteria in selecting teachers. (Author)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED282761

PREDICTIVE VALIDITY OF GPA, CAT AND NTE SCIENCE SPECIALTY TESTS ON SCORES OF A PERFORMANCE BASED STUDENT TEACHING EVALUATION INSTRUMENT

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Roger G. Olstad

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

TEACHER EDUCATION RESEARCH CENTER

Research Report No. 87-1

UNIVERSITY OF WASHINGTON
College of Education
April 1987

Roger G. Olstad
Jack L. Beal
Andrea V. Marrett

SE 048 187

BEST COPY AVAILABLE

PREDICTIVE VALIDITY OF GPA, CAT AND NTE SCIENCE SPECIALTY TESTS ON SCORES OF A PERFORMANCE BASED STUDENT TEACHING EVALUATION INSTRUMENT

A. PURPOSE OF STUDY

From an historical perspective much of the conversation about educational achievement seems redundant. Many of the forces affecting educational outcomes today are similar to those experienced in the first half of this century. Indeed, many of the issues seem remarkably similar to those of the 20's and 30's, during which time the impetus for national teacher testing occurred. The national reports recently produced reflect concerns about competency in academics, competency in teaching and competency in basic skills. Given the concern about the state of education in this country, the question is what criteria can we use and what should we measure to help correct the problems and/or allay fears? A second, related, question is when those measures should be taken - at the time of entrance to teacher preparation programs or at the conclusion of training and at the time of certification?

The purpose of this study is to examine some of the criteria currently used for admission or exit standards and to seek effective predictors for student teaching success. Specifically, this study attempts to determine whether grade point average (GPA), the California Achievement Test of Basic Skills - Total score (CAT-T), and the National Teachers Exams Specialty Tests for Chemistry, Physics and General Science and for Biology and General Science predict student teaching competence as measured by a performance based assessment instrument.

B. THEORETICAL BASIS FOR STUDY

The issues of teacher quality expressed by many of the recent national reports on excellence in education have led a number of universities and colleges to increase the admission requirements and/or the exit standards for teacher certification programs. Emphasis has been placed on higher grade point averages and demonstrated academic ability on national standardized tests, among which are the Professional Knowledge, General Knowledge, and discipline specific Specialty Tests of the National Teachers Examination. This current focus on demonstration of teaching competency is not singular to this period of time.

If one looks at the history of the National Teachers Examination, one finds that controversy over testing for certification purposes is long standing (Wilson, 1985). Parties on either side argue for or against standardized testing as a

procedure for guaranteeing capable, competent teachers. During the 1920's and 1930's as the economy made gigantic swings from excess to depressed, the market supply and demand for teachers vacilated. During the 20's a shortage of teachers fostered a demand for a 'larger stock' which could be supplied by testing and granting of "emergency" licenses to individuals who had not completed a professional certification program. During the 30's the supply was large and the call for "emergency" licenses was unnecessary. However, the call for standardized testing did not cease. Indeed, it was argued the tests were necessary to weed out those of "limited mental ability," the teaching candidates who were seen as "narrower people" with "uninformed and incompetent minds."

This unfortunate perception of ineptitude of teachers has been revived by the public reporting of the numerous current national educational reform documents just at a time of change in the supply of teachers. The reports focus on 3 main areas of teaching competency: basic skills proficiency, subject matter competency and academic performance (Roth, 1985; Nelson and Wood 1985) The argument for competency testing appears to be centered on when the individual should be "passed" as competent and how that should be determined. One camp argues that testing for competency in the academic discipline in which the teacher works should be done prior to admission to a teacher training program. The subsequent field experience for the student teacher would insure pedagogical skills. Others argue that testing should be a matter of licensing, comparable to the Bar Exam for attorneys, or the Medical Boards for physicians, and should include academic and professional knowledge competencies.

Examination of reports and research studies related to teacher testing suggest a number of underlying assumptions. Some reports suggest that schools, colleges, and departments of education are responsible for the poor preparation (of teachers) and that subject matter tests are essential to guarantee teachers who are knowledgeable in the subjects taught. This is based on an assumption that all subject matter courses within a teacher preparation program are 'watered down' for teachers (Roth, 1985). A further assumption is that academic performance of teacher education candidates is substantially less than the general college population. Another assumption is that scores reflecting academic competence correspond to teaching competence. It is further assumed that academic competence in teachers is reflected in achevement by students in the K-12 classroom. (Wilson, 1985). A closer look at this notion suggests that selection criteria for teachers ought to be based on their relative achievement on content based exams, basic skills exams, and measurements of academic achievement.

A series of studies have looked at the relationship of teacher competency testing to either selected admission criteria or to demonstrated, effective teaching. One study looked at the validity of the National Teachers Examination of General

Knowledge as a predictor of teaching success. The study looked at the relationships between the National Teachers Examination for General Knowledge (NTE GK), and grade point averages (GPA) and a test of basic skills (California Achievement Test of Basic Skills (CAT), in terms of validity as admission criteria to teacher preparation programs (Olstad, Beal and Marrett, 1985). That study found there was a significant correlation between the scores on the NTE GK and CAT Total score (CAT-T), but no significant relationship between the CAT-T and GPA or between NTE GK and GPA was found. This suggests perhaps GPA measures a separate or different characteristic from that being measured by basic skills competency tests (i.e. NTE GK or CAT-T). Other studies (Dobry, Murphy, and Schmidt, 1985; Nelson and Wood, 1985) have focused on performance outcomes as predicted by specified admission criteria. The results have shown little relationship between successful performance of prospective teachers in the classroom and 1.) academic performance as measured by GPA, 2.) academic discipline identified by declared majors and corresponding hours of coursework, or 3.) basic skills test performance.

The studies previously cited suggest that GPA and one or both kinds of basic skills scores or general knowledge measures may provide data for admission or recommendation for certification. The studies also suggest competency in an academic discipline is desireable. They do not suggest that any one of the measures relate specifically to demonstrated competency in teaching. Indeed, they only represent single data points in an evaluation of an individual's competency for teaching.

Other studies looked at the predictive ability of professional competency tests or related criteria on performance measures. In one study (Dobry, Murphy, and Schmidt, 1985) GPA was found to be related to the NTE Professional Knowledge Exam, which in turn, was found to have no predictive validity for performance. However, another study (Nelson and Wood, 1985) looking specifically at the issue of pedagogy, found that hours in methods course work and corresponding grade point averages were the single statistically significant indicator for subsequent success in teaching.

The purpose of this study is to further examine the question of competency testing. Previous studies have used general knowledge tests, or professional knowledge tests with typical screening criteria such as GPA or coursework in trying to establish predictive validity for such admission criteria. None of the studies cited investigated the predictive validity of the NTE Specialty Exams on scores achieved in a performance based student teaching evaluation instrument. The Specialty Exams test breadth and depth of knowledge in an academic discipline as it relates to the teaching profession.

C. PROCEDURE OF STUDY

In this study admission to the teacher certification program is controlled by students' GPA, which must be at or above the overall undergraduate mean (3.03 for 1985-86) and by 80% or better on the total California Achievement Test-Total score (CAT-T). Students were required to take the NTE Specialty Test for either Chemistry, Physics and General Science or Biology and General Science prior to the conclusion of their field practicum. Students' scores were not used to determine recommendations for certification however. The study was conducted for a full academic year. Scores were obtained for 24 secondary students, for GPA, CAT-T, and NTE Specialty Tests.

During their student teaching practicum, students were observed and evaluated using a lesson observation instrument. Scores were based on observed performance. At the end of the quarter university supervisors and the cooperating teacher together evaluated the student's performance on a Likert-type scale, for 11 performance-based evaluation items. The scores for the 11 items were added for a total evaluation score for the purposes of this study only.

Descriptive statistics were computed for students' GPA, CAT-T, NTE Specialty Test for their major and final evaluation scores. Regression analysis was computed for GPA, CAT-T, and NTE, on final evaluation scores.

Data on GPA and CAT-T are acquired at the time students apply for admission to the teacher certification program. Grade point average is computed on the 60 credits earned prior to admission. Scores are entered into the Teacher Education Research Center data base. Students involved in this study took the NTE Specialty Tests just prior to the end of their final quarter in the program. Scores were obtained from Educational Testing Service.

Student teaching performance scores were obtained from student files following their final evaluation. Scores for each of the performance skills were tabulated and all eleven skill scores were summed for a final score for the purposes of this study.

D. RESULTS AND/OR CONCLUSIONS

The statisical analysis shows mean scores for GPA, CAT-T, and NTE Biology and General Science, and Chemistry, Physics and General Science Tests at 3.23, 220, and 737 and 678 respectively. These scores compare to admission criteria minimums of 3.03 for GPA and 200 for CATT. The NTE scores are not used for admission or certification, but compare to national scaled scores of 87% and 84% respectively. The summed evaluation score averaged 47

points out of a possible 55. The range of evaluation scores was 32.5 to 55.

TABLE I. MEAN SCORES AND CRITERION LEVELS FOR GPA AND CAT-T SCORES, AND PERCENTILE RANK FOR NTE SCIENCE SPECIALTY EXAM SCORES

COMPETENCY MEASURE	MEAN	ADMISSION CRITERIA	PERCENTILE RANK
GPA	3.23	3.03	
CAT-T	220	200	
NTE/CHEM.	678		0.84
NTE/BIOL.	737		0.87

For the purposes of this study a decision was made to combine the percentile ranked scores for both the Biology and General Science Exam and the Chemistry, Physics and General Science Exam into a single measurement unit. This would provide an N of 24 for statistical analysis using a regression procedure. While the tests are different and scored on different populations, for purposes of this study we assumed percentile ranking on a national exam measuring achievement in a content specific area to be a meaningful unit of measurement for prediction.

Multiple regression was computed to determine predictive value of GPA, CAT-T scores, and the percentile rank achieved on a content specific national teaching exam (NTE Specialty Tests) on the dependent variable, a teaching performance score as measured by summed PBEI scores. Our hypothesis was that the NTE exams would be an effective predictor of student teaching success. Likewise, it was predicted that our admission criteria, GPA and CAT-T scores, would be effective predictors of student teaching achievement.

Table II summarizes the results of the multiple regression procedure. As can be seen in the table, none of the F scores were statistically significant. This suggests that neither GPA, CAT-T, nor the NTE Specialty Exams for Chemistry, Physics and General Science or Biology and General Science are effective predictors for student teaching performances. The findings might also suggest that sampling or measurement difficulties are contributing to the results of this study.

The table does provide other information of interest. The Simple R is a zero order correlation between the dependent variable and each independent variable. The Simple R for the NTE percentile ranks is a -0.28, with CAT-T and GPA being positive correlations of 0.10 and 0.04 respectively. The Multiple R (0.33)

shows the strength of the relationship of all of the independent variables as predictors of performance. R Square reports the proportion of variance explained by all of the variables entered into the regression as 0.11. The multiple correlations and the residuals suggest that the variables used in the study have some import, but that other factors not identified may be better predictors of performance.

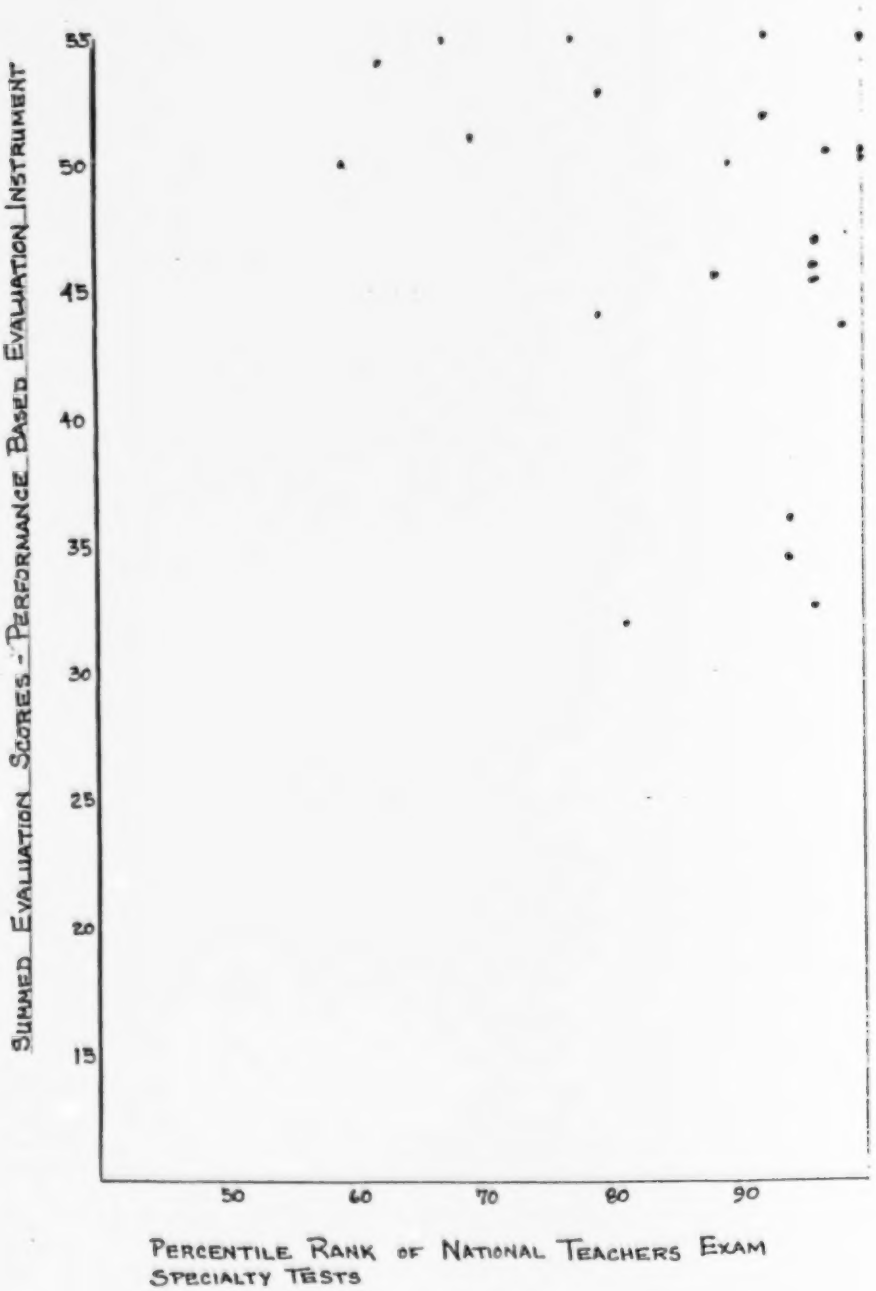
TABLE II - SUMMARY TABLE OF MULTIPLE REGRESSION OF STUDENT TEACHING PERFORMANCE SCORES ON PREDICTOR VARIABLES OF GRADE POINT AVERAGE, CALIFORNIA ACHIEVEMENT TEST TOTAL SCORES, AND PERCENTILE RANKS ON NATIONAL TEACHERS EXAMINATIONS-SCIENCE SPECIALTY TESTS

VARIABLES ENTERED	MULTIPLE R	R SQUARE	SIMPLE R	OVERALL F
Percentile Rank	0.28	0.07	-0.28	1.88 (p = .18)
CATT	0.31	0.10	0.11	1.19 (p = .32)
GPA	0.33	0.11	0.04	0.82 (p = .49)

Figure I, below, shows the NTE Percentile Rank Scores graphed against the summed scores of the Performance Based Evaluation Instrument. The data points are clustered in the upper right quarter of the graph, leading one to consider the possibility of a ceiling effect for both measures.

FIGURE 1 -

RELATIONSHIP OF PERCENTILE RANK OF SCIENCE NTE SPECIALTY EXAM SCORES TO SUMMED PERFORMANCE BASED EVALUATION INSTRUMENT SCORES



F. EDUCATIONAL OR SCIENTIFIC IMPORTANCE OF THE STUDY

Considerable emphasis is being placed on academic competence of teachers as a means to achieve excellence in the schools. Other studies have looked at GPA and standardized test scores, specifically those core exams of the National Teachers Examination, and have concluded standardized test scores and GPA are not effective predictors for teaching success. This study on NTE Science Specialty Exams confirms these findings. This study, like so many others, showed no predictive capability of these measures of academic competence. It would seem that academic competence is just one of the important criteria in selecting teachers. While it may not be predictive of competence in teaching performance, perhaps it is a critical, minimum standard which all prospective teachers should meet before going onto pedagogical training.

High GPA and CAT-T test scores currently used as admission criteria for the teacher education program created a select population for this study. This in turn seemed to result in narrow variance in performance scores of student teachers. It would seem that when academic admission standards are high, the variance in performance of student teachers on the Performance Based Evaluation Instrument (PBEI) is insufficient to allow prediction to occur. Perhaps the PBEI is not sufficiently sensitive to detect differences among students in their final evaluation. In which case, the study ought to be redone using an assessment instrument that is scored according to the presence or absence of specific behaviors.

REFERENCES

Dobry, A.M., Murphy, P.D., and Schmidt, D.M., "Predicting Teacher Competence", Action in Teacher Education Vol. 7, N1-2, Spr-Sum 1985

Menacker, J., Hurwitz, E., and Weldon, W. "Teacher Upgrading: Policy Alternatives", The Education Forum, Vol. 50, No.2, Winter 1986

Nelson, B., and Wood, L., "The Competency Dilemma", Action in Teacher Education Vol.7, N1-2, Spr-Sum 1985

Olstad, R.G., Beal, J.L., Foster, C.D., and Marrett, A.V. "A Validity Study of NTE General Knowledge Component as a Predictive Instrument for Successful Student Teaching" Research Report No. 85-1, Teacher Education Research Center, University of Washington, Mar. 1985

Roth, R.A. "Teacher Competency Testing: Implications for Certification, Program Approval, and the Teacher Education Curriculum" Action in Teacher Education Vol. 7, N1-2, Spr-Sum 1985

Sandefur, J.T., "Competency Assessment of Teachers", Action in Teacher Education Vol. 7, N.1-2, Spr-Sum 1985

Wilson, A.J., "Knowledge for Teachers: The Origin of the National Teacher Examinations Program." Paper presented at the Annual Meeting of the American Educational Research Association at Chicago, IL. March 31-April 4, 1985.